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ABSTRACT

This study was conducted at a midwestern university to determine whether a commercial firm can serve as a viable alternative to the conventional library source for academic interlibrary loan document delivery service. One hundred twenty-four identical article requests were ordered electronically and almost simultaneously from both the University Microfilms International (UMI) Article Clearinghouse (a commercial firm), and Wisconsin Interlibrary Services (WILS). Data were recorded for evaluating collection coverage, fill rate, turnaround time, document quality, and direct cost per article over 37 consecutive work days. It was found that UMI can provide photocopied articles of good quality but at a greater cost and without improvement in the turnaround time; many requests could not be directed to the company because of their limited coverage; and, for the number of requests made, the firm's fill rate was less than that of WILS. The following conclusions were reached: (1) even at greater expense, the interlibrary loan manager may find commercial firms convenient for handling copyright compliance and filling requests unavailable from traditional sources; (2) telefacsimile promises improvement in turnaround time; and (3) although WILS does an excellent job in meeting the university's interlibrary loan needs, commercial firms can also be utilized to broaden that kind of service. (32 references) (CGD)

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# An Evaluation of Document Delivery Service to Interlibrary Loan: A Commercial Firm and a Traditional Library Source

by

Kathleen F. Halsey

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Management
Cardinal Stritch College
December 1988

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ABSTRACT

Document delivery, an extremely important phase in the interlibrary loan process, requires more attention to ensure timely fulfillment of research needs. Until recently, libraries have depended on one another to fill photocopy requests, but with the establishment of commercial document delivery firms, interlibrary loan managers now have alternative sources. However, not much is known about performance of the commercial firms.

To answer this concern, the researcher conducted a study at the University of Wisconsin-Stevens Point (UW-SP) to determine if a commercial firm can provide effective and efficient document delivery service to a medium-sized academic library. In the study, funded by a UW-SP Personnel Development Committee grant, 124 identical article requests were ordered electronically and almost simultaneously from both a commercial firm, the Article Clearinghouse, and a traditional library source, Wisconsin Interlibrary Services (WILS). The study, occurring over 37 consecutive work days, represented broad subject requests and both heavy and light usage periods. Appropriate data was recorded to evaluate collection coverage, fill rate, turnaround time, document quality, and direct cost per article.

The results revealed that the Article Clearinghouse could fill 60% of the total requests received during the study period, compared to 95% for WILS. Of the 124 verified requests sent, the Article Clearinghouse filled 118, compared to a 100% fill rate for WILS. The mean turnaround time for document delivery was 7.76 days for the Article Clearinghouse and 7.31 days for WILS, a statistically insignificant difference. Telefacsimile delivery reduced the turnaround time to 2 days for both sources. Copy quality was generally good for both sources, but with some inconsistencies. At the current rate schedule, the Article Clearinghouse charged $3.97 more per article than WILS.

As a result of this study, the researcher concluded the following: even at a more expensive rate, the interlibrary loan manager may find commercial firms convenient for handling copyright compliance and filling requests unavailable from traditional sources; telefacsimile promises a brighter future for improvement in turnaround time, but further study is needed; and WILS, the Wisconsin Consortium, does an excellent job in meeting most of UW-SP's interlibrary loan needs. The researcher plans to utilize commercial firms to broaden interlibrary loan service at UW-SP.

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# CHAPTER 1

# INTRODUCTION

## Purpose and Problem

For a variety of reasons, including the knowledge explosion, insufficient budgets, and inflationary pressures, librarians often find themselves unable to supply all their patrons' informational needs with in-house materials. Complicating the situation even more is the quick and easy access to bibliographic citations that on-line searching and CD-ROM data bases provide. To meet patron demand for materials unavailable locally, libraries of all sizes and types have created networks throughout the country for the purpose of borrowing and lending various print resources. It is the function of an interlibrary loan department to accept patron requests, verify that the bibliographic information is correct, determine an appropriate supplier, and transmit the request. In addition, it is the responsibility of interlibrary loan to adhere to federal copyright restrictions.

Within the past 10 years, computerized bibliographic utilities have dramatically changed interlibrary loan practices. One system, the Online Computer Library Center (OCLC), headquartered just outside Columbus, Ohio, serves thousands of libraries and has more than 17 million records in its electronic data base. Since 1979, interlibrary loan

librarians have been able to search this data base to verify bibliographic information, identify libraries which hold desired materials, and then electronically transmit orders that automatically progress to as many as five potential lenders until one of them fills the request. Thus, OCLC has eased much of the drudgery and uncertainty formerly associated with interlibrary loan, but savings in time have been more than off-set by a substantial increase in the number of requests.

A recent alternative to the traditional direct library-to-library borrowing is the development of commercial document delivery firms. For a fee, these firms will deliver documents within a relatively short period of time. Wood (1982) defined two types of private sector, non-library document suppliers: those that maintain collections of journals, such as indexing and abstracting services and University Microfilms International, a firm that supplies backfiles of journals to libraries in microform; and those information-on-demand brokers who acquire copies of needed documents from libraries.

These for-profit suppliers, found mostly in the United States and often geared for the corporate client, offer some attractive features for traditional interlibrary loan borrowers. They eliminate copyright clearance concerns and accept orders via a number of modes: online search ser-

vices, electronic mail systems, bibliographic networks, telephone, and mail. However, little information has been documented concerning their service performance as related to fill rate, speed of delivery, and quality of the copies provided. Also of concern, especially to publicly funded libraries, is the lack of cost studies.

Since patron satisfaction with interlibrary loan is so dependent on delivery speed, it is important to assess any development which may significantly affect the delivery phase, and to that end a study has been conducted at the University Library of the University of Wisconsin-Stevens Point (UW-SP) to determine if a commercial firm can serve as a viable alternative for document delivery. The purpose of the research was to evaluate and compare the quality of service, the turnaround time, and the direct costs involved in requesting periodical articles from a non-library commercial firm versus a traditional library source.

The commercial document delivery service chosen was the University Microfilms International Article Clearinghouse, located in Ann Arbor, Michigan. Established in 1983, this service has expanded to include over 10,000 periodical titles covering a broad range of subjects, including science and technology.

The Wisconsin Interlibrary Services (WILS) served as the traditional source for filling requests. WILS, the

statewide resource sharing network for 300 member libraries of all types, is headquartered at the University of Wisconsin- Madison. WILS accepts requests via a variety of means, including the OCLC Interlibrary Loan Subsystem, and fills requests from resources available at the Madison campus and from member libraries and other sources as needed.

The researcher sent identical requests to both the Article Clearinghouse and WILS and collected data for each request. The matched pairs of requests were then statistically analyzed for evaluation purposes and compared for practical application.

## Scope

The purpose of this study was to evaluate the impact that the use of a commercial document delivery service might have on the UW-SP Interlibrary Loan Department. The University has an enrollment of 9,400 and offers a diverse curriculum with an emphasis in teacher education, communicative disorders, home economics, paper science, and natural resources. The Graduate School offers master's degrees in nine disciplines. The University Library, which serves the research needs of the entire campus, contains 250,000 volumes, 600,000 federal and state documents, and

has subscriptions to about 2,000 periodical titles. These holdings are supplemented by interlibrary loan, which last year (1986-1987) requested 2,326 items from other libraries. With an interlibrary loan service of this magnitude, it is important to assess from a management standpoint any new service or technology that may significantly enhance patron satisfaction.

The researcher, a professional librarian, has served as head of interlibrary loan at UW-SP for the past 15 years and is responsible for the management decisions affecting that department. The Library Assistant has had 4 years of experience in transmitting requests electronically and assumed that responsibility for this study.

The thrust of this research was to compare the performance of a commercial document delivery service versus a traditional interlibrary loan source, with as many variables as possible held constant. For the purposes of this research, document delivery is defined as the supplying and shipping of duplicated articles from a selected source to the requesting library. The researcher chose the Article Clearinghouse, a collection-based supplier as the commercial vendor, and WILS as the traditional interlibrary loan source. Over a period of 37 business days from October 21 to December 11, 1987, 502 interlibrary loan requests were received from patrons. Of these, 124

requests met the criteria for the study and were sent electronically and almost simultaneously to each supplier. These 124 pairs of requests represent a significant sample of the total number of requests received.

Excluded from the study were requests for photocopies of transactions, proceedings, tables of contents, sections of books, Educational Resources Information Center (ERIC) materials, technical reports, and government documents, materials that are unlikely to be available from a commercial document delivery service. The researcher also excluded any requests that may have been delayed because of difficulties due to incomplete bibliographic information.

The requests included in the study represent the broad range of patrons served by interlibrary loan: undergraduates, graduate students, faculty, staff, and community members. The subject matter of the requests reflects a similar broad range.

Other variables in interlibrary loan service, such as time to prepare the patron request, time to process the received materials, and estimates of costs, were also controlled. Only the time from electronic transmission of the request to receipt of the material was measured, and because interlibrary loan costs are complex and methods for their computation vary from one institution to another,

only the direct charges were taken into account. Data for analysis of the turnaround time and quality of materials received was uniformly maintained in a log for later statistical evaluation.

## Theoretical Framework

The major goal for any interlibrary loan service is to fill requests for materials not owned locally in an economical, timely, and efficient manner. Three performance criteria can be used to measure this interlibrary loan service objective: satisfaction or fill rate, speed of supply or turnaround time, and cost (Line, 1979). To successfully manage interlibrary loan, the challenge to the librarian is to examine the emerging possibilities caused by external factors, primarily technology, and then implement the most effective means for achieving the department's goals.

Although commercial document delivery services have been serving the needs of corporate clients for a decade or more, their role in an academic library environment is still not clear. Allen (1985) believed analysis is needed to compare cost effectiveness and efficiency of commercial document supply services versus those of traditional interlibrary loan services. The Library of Congress Network

Development Office issued a report on document delivery in 1982 with a recommendation that more current data should be collected.

Hurd and Molyneux (1986) researched the problem at the University of Virginia Science and Engineering Library to determine whether a commercial document delivery service could provide documents in less time at prices competetive with conventional interlibrary loan sources. Another study, performed at the Mann Library, Cornell University, and funded by the Council on Library Resources, attempted to improve the speed and identify cost-effective means for obtaining documents on interlibrary loan (Currie, 1987). As a result of the two studies, librarians at both institutions plan for flexibility in utilizing an additional source, but with reservations concerning the high costs. The researchers of the two studies also referred to the growth and potential of commercial document services and indicated a need for further study concerning the many elements of document delivery.

Given these calls for further studies, the research performed at UW-SP should be a useful addition to the small body of literature directly applicable to this interlibrary loan management concern. As more information on document delivery performance by commercial firms becomes available, interlibrary loan librarians will be able to make more

effective decisions in selecting sources of supply for desired materials.

# CHAPTER 2

# LITERATURE REVIEW

## Introduction

### Restatement of Purpose

The past decade has been a period of transition for academic libraries. At the same time that collection self-sufficiency has disappeared as a feasible goal because of economic constraints, there has been an explosion of demand for information, due primarily to the recent advances in accessing bibliographic information via electronic means. This demand has put greatly increased pressure on the existing interlibrary loan structure, and interlibrary loan librarians who are concerned with maintaining a high level of patron satisfaction must continually be aware of any developments that have the potential for improving service.

One such development is the emergence of commercial document delivery services that may serve as alternatives to traditional library-to-library borrowing. To evaluate the use of a commercial vendor as part of interlibrary loan in an academic library setting, the researcher undertook a study at the University Library of the University of Wisconsin-Stevens Point (UW-SP).

In this study, identical requests for periodical articles were sent to University Microfilms International's Article Clearinghouse, a commercial vendor, and the

Wisconsin Interlibrary Services (WILS), a traditional source for direct library-to-library borrowing. The four factors measured and compared were availability and fill rate, turnaround time from electronic transmission of the request to receipt of material, quality of the material received, and direct cost.

Management Rationale

Boucher (1984) has acknowledged that the interlibrary loan librarian works in an open system in which there is little control over factors which impinge from a changing external environment. Unpredictable requests from patrons, technological advances in communications, and the lending policies of other libraries demand that the librarian remain alert to new ways to manage change. Interlibrary loan managers must give considerable thought to the purpose of interlibrary loan service, how well it is being performed, and to changes that need to be instituted now or in the forseeable future.

Boucher (1984) stated that planning is the process of identifying desirable change and making it desired. She added that evaluation and leadership go hand-in-hand with planning, and these three aspects of management can be used to develop new and more efficient and effective ways of doing interlibrary loan.

Recognizing the possibility of using commercial document delivery services as an alternative to traditional loan sources is a responsible management approach to improving interlibrary loan service. Information from gathered and analyzed data will aid librarians in their decision-making task of selecting sources to supply requested materials. The managerial functions of planning, organizing, staffing, leading, and controlling (Koontz, O'Donnell, & Weihrich, 1986) all interact in the management process of selecting and evaluating the use of commercial document delivery in an academic interlibrary loan environment.

As we enter the information era, librarians are becoming information managers and professionals, and according to Kenney (1982), they must realize that they are in the information business. He pointed out that the most important job of librarians is to make the many and varied information resources available to their publics. Those who do not meet the challenge will be obsolete.

## Management Issues and Research Studies

The literature relevant to the choosing of document delivery suppliers is relatively sparse. However, the researchers discuss the factors to be considered for selection and evaluation of a service; they note the lack of information concerning the performance of non-library

document delivery services; they issue calls for further investigation of the place that commercial services may have in traditional interlibrary loan; and they address the complexity of calculating interlibrary loan costs that leads to difficulty in comparing the costs of document delivery services.

Two recently published studies detail research somewhat similar to that performed at UW-SP. Their findings concerning the practicality of using a for-profit firm in comparison to a traditional library source are thus particularly relevant.

## Relevant Management Issues

As library patrons make more and more demands on the existing interlibrary loan structure, it is imperative to seek newer methods to fulfill the goal of effective service, especially improvement in the timely delivery of materials. One such method, the commercial document delivery firm, deserves attention. Allen (1985) believed that a proper analysis of the processes and costs involved in interlibrary loan activities might well reveal that commercial document supply services are or will become a realistic alternative to direct contacts between libraries.

For more than a decade, various researchers have expressed doubts concerning the total reliance of interlibrary loan on library-to-library borrowing. Pings

(1974) believed that cooperative groupings of libraries formed to accomplish specific objectives with document delivery would be self-limiting in that they were library-to-library arrangements. He further predicted that such arrangements would become unstable due to threatening copyright restrictions on reproducing copies.

In 1978 Dougherty predicted that academic librarians would be forced to turn their attention to document delivery. He believed that as comprehensive bibliographical access evolved, even heavier burdens would be placed on existing lending and borrowing systems. Library users can now more easily identify desired materials, but if librarians cannot promptly obtain requested items, they will have to face increasing numbers of frustrated users. Dougherty issued a call to devote more attention to the delivery of materials and predicted that the need for better document delivery systems to handle larger capacities would emerge as a major library issue.

The Library of Congress Network Development Office commissioned papers and held group discussions on document delivery in 1982. The Network Advisory Committee concluded that more current data on document delivery should be collected.

A 1982 survey by King Research, Inc. for the United States Copyright Office found that the use of commercial document delivery services by academic libraries was

somewhat limited. Another study, conducted by Information Systems Consultants, Inc. (1983), reported to the Council on Library Resources that there had been a steady increase in online searching and requesting of materials, but there had not been corresponding changes in the patterns of movement of materials among academic libraries. Their report predicted that there would be a gradual increase over the next five years in the number and percentage of documents provided by commercial document delivery services and a heightened awareness by librarians using electronic means to locate and request materials that the delivery phase is the time consuming element in the interlibrary loan system. Even though there was virtually no information available about the performance of commercial document services, it was the opinion of the consultants that a major collective study is not the key to the problem because there is no evidence that the library and document services communities at large are seriously concerned about the performance of document delivery.

A session at the 1985 American Library Association annual conference focused on the increasingly ambiguous relationship between traditional interlibrary loan practices and the new fee-based services. Speaking at the Reference and Adult Services (RASD) program, David Brunell, Director of the Bibliographic Center for Research, urged librarians to accurately examine their priorities and

judiciously review the advantages and disadvantages of commercial delivery services. Henshaw (1985) maintained that the RASD Interlibrary Loan Committee had taken a fairly conservative approach to document delivery service, but praised their sponsorship of this session entitled "Document Delivery: Technologies and Strategies for Libraries in the Mid-1980s" and hoped that the group would continue to address this critical issue.

In reviewing interlibrary lending practices from 1975 to 1985, Bennett (1985b) found that commercial document suppliers are largely a recent American phenomenon, with no mention of them in earlier reviews. Wiggins (1985) also found relatively little in the literature on the use of alternative or non-interlibrary loan document access systems. He concluded that good comparative data does not exist on the delivery times of interlibrary loan services versus those of commercial document delivery services. Wiggins also noted that the data which is available to make decisions concerning document delivery contains real information gaps.

Henshaw (1984) reported that there was a growing number of commercial suppliers who provide documents with consistent speed and cost. However, according to Bennett (1985a) university libraries mostly lend to and borrow from other university libraries, and this situation has remained unchanged since 1971. Except for special libraries, most

interlibrary loan transactions occur between libraries of the same type. Special libraries, which are often associated with for-profit organizations, now rely more heavily on commercial document delivery services as a source of materials which previously would have been acquired through the traditional interlibrary loan system (Waldhart, 1985a).

Pickup (1978) stated that the external service supplier can offer tremendous advantages. The first is a cost advantage deriving from the economics of scale. The second advantage is that the external services can offer a breadth of coverage which could never be contemplated by the independent unit. Pickup declared that it is up to the commercial suppliers to take up the challenge and develop this market for the benefit of the user, the supplier, and the nation as a whole.

De Gennaro (1979) also maintained that if the range of services and products available to libraries is to expand and improve, the best thing to be done is to encourage variety, competition, and cooperation among commercial vendors of library information services. In 1981 De Gennaro presented an overview of a rapidly changing library and information scene, noting that there was virtually no central planning, funding, controlling, or coordinating authority guiding the development and activities of United States libraries. According to De Gennaro, the principal

driving force is the extraordinary degree of initiative, flexibility, and freedom of action enjoyed by the managers of the several thousand separately funded and independent academic, special, and public libraries in the country. In his opinion, however, librarians frequently underestimate or overlook the new information market-place.

The delivery of documents and information services by a new breed of aggressive vendors is rapidly increasing in scope, volume, and importance, and by the end of the decade these commercial companies may well become formidable competitors to traditional libraries and networks as suppliers of certain kinds of documents and information sources. De Gennaro (1981) concluded from his overview of resource-sharing trends in the United States that the greatest success has come from allowing the entrepreneurial forces of the private sector to act in the best interests in providing a variety of document delivery services.

De Gennaro (1981) cited University Microfilms International as an aggressive vendor which offers microfilm or hard copy of runs of journals or single articles from its growing collection of journals. Bennett (1984) also cited the advantages of University Microfilms International's Article Clearinghouse: immediate access to articles and handling of all copyright clearance questions by the company; articles transmitted within 48 hours of receipt of request, with same-day service available at extra cost;

holdings verifiable in a printed catalog or accessible on-line; wide coverage of subjects; and a selection of payment methods. Bennett concluded that managers must weigh the need for faster service against cost, but in his opinion, assured availability and speedy supply within the given limits will be attractive to certain categories of users.

Although there are no generally recognized standards for interlibrary loan performance, there is a recognition of the key factors influencing the success of document delivery. Among the most obvious are the three main criteria discussed by Line (1979) for evaluating efficient performance of interlending systems: satisfaction rate, speed of supply, and costs. Waldhart (1985b) further defined these key factors: the satisfaction rate, also called success rate or fill rate, is the relationship between the total number of interlibrary loan requests and the number of requests successfully completed; speed of supply, also known as response time or turnaround time, is the amount of time elapsed between the initiation of a request and its completion; and cost or efficiency is the level of resources consumed in the completion of interlibrary loan requests. Without valid data related to these criteria, any evaluation of interlibrary loan service would be impossible.

Unfortunately, there are no accepted standards concerning how to measure the performance criteria or what constitutes a desired or acceptable level of achievement. For example, the elements of response time can include: (1) the time the requesting institution takes to locate the material and prepare a request; (2) the time the request is in transit to the supplier; (3) the time required by the supplier to process the request; (4) the time the requested material is in transit to the requesting library; and (5) the time it takes the requesting library to provide the material to the requestor. All of these elements combined determine how long a library patron actually waits for requested material (Information Systems Consultants Inc., 1983). Individual studies on performance may include one, some, or all of the factors. Without standardization of measurement and precise definitions of what is being measured, librarians may find it difficult to make valid comparisons.

Improvements in document delivery can result in significant improvements in total turnaround time, and this, according to Waldhart (1985b), motivates the study of document delivery. Wiggins (1985) agreed and found through his research that what motivates librarians the most in making document delivery decisions is the desire for speedy service. He asked two groups of librarians, for-profit special librarians and academic special librarians, to rank

twelve factors which might affect their choice of document delivery mechanisms. The rapidity of supplying a copy of the article and fast feedback on the availability of the article were ranked number one and two respectively. Relative to other factors, cost was only moderately significant. The librarians in his study seemed to think that the prices charged by commercial suppliers are reasonable, and they sometimes bypassed large research libraries as a source of supply if the interlibrary loan costs were too high. Only the academic librarians in the study often bypassed commercial document delivery suppliers because of cost-related factors and the organizational difficulty of dealing with deposit accounts.

In a 1985 study, Allen found a negative attitude by librarians toward the use of commercial information brokers due to the high cost of these services. Those libraries using commercial services did so because the service was quick. Allen posed the premise that if librarians totalled all the costs associated with traditional interlibrary loan service, then it is quite possible that the commercial services would prove to be competetive.

Unfortunately, the complexity of determining interlibrary loan costs makes cost comparisons difficult. Differences in local policies, personnel, procedures, types of materials borrowed and loaned, and other factors raise questions of what to measure and how to measure it

(Waldhart, 1985b). As a result, cost analysis seldom has relevance beyond the study's definition of the local environment. Waldhart also reported that estimates of the average cost of interlibrary loan transactions vary from a low of $1.00 to a high of $15.00. Campbell (1985) agreed with the high estimate and listed the cost of each loan at $15.00.

A less obvious consideration in selecting a document supplier, but one that can mean a difference between rapid or unreasonably slow turnaround time, is the convenience of payment options (Colbert, 1983). Although many suppliers offer more than one payment option, Colbert suggested that carefully selecting the one that best meets the needs of the individual library will ultimately save both turnaround time and money.

Line (1983) listed the requirements for document delivery from the viewpoint of users. They desire reliability, probability of success, speed of supply, little or no cost, an acceptable form or good reproduction, and ability to assess content and quality before ordering. Libraries desire these same qualities plus ease of request and payment, reasonable costs, and a single point access for all materials.

Finnigan and Rugge (1978) listed a slightly different set of criteria for good document delivery service: speedy fulfillment time, low rates and charges per piece, no form

requirement, a verification service, rush and call-in service, and deposit or charge accounts. They noted that each vendor offers a different mix of features, giving users the opportunity to choose the vendor that best meets their needs.

Kennedy (1987), Marketing Manager at University Microfilms International, explored the relationship of commercial document suppliers to traditional interlibrary services. She noted that from their inception, collection-specific suppliers marketed their services primarily to libraries. With more librarians now recognizing commercial document suppliers as viable alternatives to traditional interlibrary loan, the lines separating the traditional services from the commercial services are beginning to blur.

Increasing pressure on the interlibrary loan system, a growing realization of the true cost of requests, and responsive service from the for-profit sector are resulting in the growing acceptance of commercial document delivery services in libraries. These commercial firms are in competition with library resource sharing, and Kennedy (1987) admitted that winning over customers is a long-term endeavour. If the labor-intensity of interlibrary loan is out of proportion to its costs and benefits, commercial involvement in interlibrary loan can offer the librarian an important tool for streamlining and speeding up the

document delivery process. In order to survive, however, the commercial supplier must offer, at an extremely competetive price, better, faster, and more flexible service than libraries can offer one another.

## Related Studies

A study conducted at Southeastern Louisiana University measured the turnaround time for interlibrary loan transactions using the Online Computer Library Center Interlibrary Loan (OCLC ILL) Subsystem (Budd, 1986). The data includes the mean, median, and range on the turnaround time for each phase of the loan transaction. In comparison with other studies of the OCLC ILL Subsystem, the turnaround time for interlibrary loan transactions has varied little since the Subsystem became operational in 1979. Budd reported that a mean time of 13.76 days elapsed from the entry of a request for a periodical article into the OCLC ILL Subsystem to receipt of the requested material. This turnaround time is the interval over which the borrowing library has little control. Budd also reported that an increasing portion of this interval occurs from the date the material is shipped to the date it arrives, when it is apparently in the mail. Budd believed that researchers should investigate both the economics of interlibrary loan and the use of telefacsimile or express mail services.

In another study, Currie (1987) investigated whether commercial document delivery sources could reduce the time lag between the decision to get information and its receipt. She conducted the research at the Albert R. Mann Library of Cornell University, the largest academic agricultural library in the United States. A specific objective was to evaluate and test whether commercial document sources could provide photocopied articles more quickly and inexpensively than traditional library sources.

In Currie's study (1987), each of 124 interlibrary loan periodical requests was sent to three sources: a collection-based commercial source; a commercial information broker; and a traditional library source. Measured were the online verification and ordering costs, the turnaround time between ordering and receiving a document, and the cost of the document.

Currie stated that the bottom line in any document delivery process is whether the document is delivered, and her findings showed that the traditional interlibrary loan sources supplied a greater percentage of the documents requested. The commercial sources are limited in their resources, and even for materials listed as available, they said copyright problems or the age of the material made the documents unavailable.

Currie also reported that library-to-library borrowing is the clear winner in the cost category because of

reciprocal arrangements. However, real costs of these transactions were not determined. Despite the higher costs, one advantage of the commercial suppliers is the handling of copyright clearance, thus freeing the library from maintaining complex records.

Currie concluded that commercial sources can speed delivery, but at great monetary cost. The traditional interlibrary loan sources were almost as fast as the commercial suppliers, but considerably less expensive. She also concluded that her library's present arrangement of document delivery under membership in the Research Libraries Information Network (RLIN) is the most cost effective. Not included in the study were the use of telefacsimile or comparisons of first class mail versus special delivery services. According to Currie, these aspects of document delivery deserved study, too.

Hurd and Molyneux (1986) evaluated delivery times and costs of a non-library document delivery service. They conducted the study at the University of Virginia Science and Engineering Library to determine whether a commercial document service could provide documents in less time at prices competetive with conventional interlibrary loan services. Duplicate requests were sent to a conventional interlibrary loan source and University Microfilms International's Article Clearinghouse, thus allowing direct comparison of delivery time and costs. The results indicate

that the Article Clearinghouse is on average 3.6 calendar days and 2.5 business days faster than the conventional source, but there was greater inconsistency in delivery time, which the authors attributed to personnel changes at the Article Clearinghouse during the period of the study.

At the time of the Virginia study, the Article Clearinghouse based the price per article on the size of the deposit account. Taking two of the pricing levels into consideration, Hurd and Molyneux (1986) concluded that an article cost $2.66 more from the Article Clearinghouse at the lowest deposit level and $1.09 more at the highest deposit level.

Further observations noted that only one fifth of the interlibrary loan requests received during the period of the study were available in journals held by the Article Clearinghouse, but with the recognition that the Article Clearinghouse's resources are steadily growing; that the Article Clearinghouse's photocopy quality was better than the conventional source's in 13 of 15 cases where there was a noticeable difference; and that the Article Clearinghouse was unable to fill 13.9% (5 of 36) requests even though its catalog listed the source periodicals as available. The company denied 3 of the requests because of copyright restrictions and replied that 2 others were unavailable.

Williamson (1987) conducted an unpublished commercial document delivery study for five consecutive days at the

Madison headquarters of Wisconsin Interlibrary Services (WILS). The purpose was to determine the difference between turnaround time for commercial services versus WILS, to identify actual costs for requests filled through commercial services, to compare fill rates, and to determine coverage of materials available through commercial services.

Williamson sent 20 requests to WILS resource libraries and 20 requests to two commercial services, 10 each to Chemical Abstracts Service (CAS) and Original Tear Sheet Service (OATS). She found that the average turnaround time for the WILS libraries was 11.5 days compared to 9 days for the commercial services. She also determined that shipping is the most time-consuming aspect of document delivery. One of the commercial services generally filled requests in 24 hours, but had an overall turnaround time of 8 days. Out of 153 article requests falling into the scientific/technical category, 77 were available through the commercial document delivery services, but only 4 of the 77 were not available through WILS resources. Of the 20 requests sent, the commercial services filled 15, compared to 14 provided by the WILS libraries. The commercial services gave the following reasons for unfilled requests: "not owned," even though listed as being owned, and "out of copies," with no publisher arrangements to produce more.

## Conclusions

Given the continuing explosion of information, no library collection can be self-sufficient. Rapid technological advances and economic constraints demand new management approaches in order to satisfy the public's information needs. The interlibrary loan librarian must be aggressively involved in the functions of planning, organizing, staffing, leading, and controlling (Koontz, O'Donnell, & Weihrich, 1986) in order to successfully meet the goals of service in today's changing environment. The librarian as manager must be able to coordinate these five functions in order to contribute to the individual objectives of the department.

The goal of interlibrary loan is to obtain a document in an expeditious manner and at minimal cost. A very important part of the process is the selection of a supplier. Libraries have traditionally depended on other libraries, and as a result networks of resource sharing have developed. Now, however, librarians are beginning to recognize the need to improve existing document delivery patterns and are examining the role that recently developed commercial document delivery services might play. These firms include online search services, information brokers, and indexing/abstracting services.

It appears from the literature that commercial document delivery services have the potential for improving interlibrary loan service. Several researchers and library associations have encouraged studying and evaluating the activities of such firms in order to aid the interlibrary loan decision-making process.

There have been difficulties in determining what to measure and how to measure it in order to secure meaningful data for diverse library situations and structures. There is agreement that the three main criteria, satisfaction rates, speed of supply, and costs (Line, 1979), constitute the elements for evaluating and judging the performance of interlending systems. In addition, the interlibrary loan manager must consider reliability, good reproduction of documents, and ease of request and payment (Line, 1983). All of these factors are interrelated, and any planned improvements in the interlibrary loan process must take them all into account.

Three studies conducted respectively at Cornell University, University of Virginia, and Wisconsin Interlibrary Services (Currie, 1987; Hurd & Molyneux, 1986; Williamson, 1987) evaluated transactions with commercial firms and found that they provided somewhat faster service than conventional library sources but at greater expense. The researchers in all three studies indicated that limited

periodical holdings and inconsistencies were factors to be reckoned with when dealing with the commercial vendors.

Hurd (1986) and Currie (1987) stated intentions to continue using the commercial sources for future needs. They believed that they had gained flexibility by obtaining documents from a variety of sources, thus improving service for their library users. However, both researchers referred to the need for further examination and evaluation of commercial document delivery.

Given these calls for further study, the somewhat ambiguous findings of earlier studies, and the apparently improving ability of the commercial services to meet user needs, the researcher undertook the UW-SP study to determine if a commercial document delivery service could effectively be incorporated into the interlibrary loan service of a medium-sized university library with patron requests coming from a wide variety of disciplines. The researcher evaluated the firm for satisfaction rate, turnaround time, quality of copies, and costs. This information is essential in making effective management decisions concerning interlibrary loan service.

# CHAPTER 3

# METHODOLOGY

## Research Design

The purpose of this research was to evaluate an alternative means of document delivery service to a university interlibrary loan department. The research, conducted at the University of Wisconsin-Stevens Point (UW-SP), was designed to determine the potential for a commercial document delivery service to improve interlibrary loan service in comparison to traditional library-to-library borrowing.

The researcher chose University Microfilms International Article Clearinghouse, located in Ann Arbor, Michigan, to represent the private sector document supplier. The Article Clearinghouse, a collection-based commercial document delivery service, has a number of features that make it an attractive alternative source for journal articles: the parent company is familiar to and respected by Wisconsin libraries; there is broad coverage of subjects; requests can be transmitted electronically via the Online Computer Library Center Interlibrary Loan (OCLC ILL) Subsystem; and a deposit account can be established for ease of payment.

University Microfilms International (UMI) is a firm that provides backfiles of journals and copies of doctoral dissertations to libraries in microformat. In 1983 UMI established the Article Clearinghouse as a separate unit, but

based on the company's extensive collection of journals. Coverage continues to expand, and the Article Clearinghouse currently has access to more than 10,000 periodical titles.

As part of its service, the Article Clearinghouse handles all copyright matters. Special copyright permission arrangements have been made with publishers, and a portion of the fee charged for document delivery is paid as a royalty or copyright fee directly to the publishers. In addition, the Article Clearinghouse guarantees 48-hour in-house turnaround time for all available articles published within the last 5 years. If the deadline is missed, the company fills the order at no charge. Articles published earlier than 5 years ago are shipped within 4 business days by first class mail. Rush handling and delivery options are available for even faster service, but at extra cost.

Wisconsin Interlibrary Services (WILS), a state level document delivery provider, served as the traditional library source for filling requests in this study. The WILS office, located in the resource library at the University of Wisconsin-Madison, accepts requests sent electronically via the OCLC ILL Subsystem. Once a request is received, the WILS staff rely on the resources of more than 20 specialized libraries on the Madison campus. If the request cannot be filled using those resources, the staff may refer it to other Wisconsin libraries, to the Minnesota network

(MINITEX), the State Library of Illinois, the University of Illinois at Urbana, or to other libraries or sources in the United States. WILS ships requested materials Monday through Friday by United Parcel Service or U.S. Mail, or they may send an occasional article by telefacsimile. WILS claims a 48-hour in-house turnaround time. The UW-SP University Library is a participating library in the WILS network and pays an annual fee based on usage to belong.

All requests received by the interlibrary loan department for a period of 37 working days from October 21 to December 11, 1987, were possible candidates for the study. Requests for journal articles which were available from both the Article Clearinghouse and WILS were included in the study, and once an eligible citation was received from a patron, duplicate requests were transmitted electronically and almost simultaneously via OCLC to the two document providers. The eventual sample size consisted of 124 paired requests.

The independent variable in this study was the performance of the commercial document delivery firm, the Article Clearinghouse. The basic structure of the research design involved dependent samples that formed 124 matched pairs. Thus, the individual observations of the Article Clearinghouse samples were matched with the individual observations of the WILS samples, with WILS, the traditional source of loans, serving as the control. The researcher recorded data

for fill rate, turnaround time, and document quality. These performance factors constitute the dependent variables of the study. The results were analyzed for differences in the 124 matched pairs.

## Evaluation Design

### Evaluation Questions/Hypothesis

The researcher designed this study to determine whether interlibrary loan document delivery service could be improved by accessing a commercial firm. The null hypothesis is that there is no difference between document delivery service offered by a commercial document delivery source, the Article Clearinghouse, as compared to a traditional library source, WILS. The alternative hypothesis is that there is a difference between the two services.

The researcher formulated the following questions to provide evidence for evaluating a commercial document delivery firm:

1. Did the Article Clearinghouse's collection of journals meet the UW-SP University Library's needs?
2. Was the Article Clearinghouse's fill rate equal to or better than the WILS rate?
3. Did the Article Clearinghouse's turnaround time compare favorably with that of WILS?
4. Were all the Article Clearinghouse photocopies of acceptable to excellent quality?

5. Were the Article Clearinghouse's charges competitive with WILS' charges?

Measurement Techniques

The researcher maintained a log for the purpose of gathering information needed to answer the evaluation questions and to test the hypotheses. Specific data was entered daily as transactions were sent and messages and materials received.

The researcher used inferential statistics to interpret the results for speed of delivery or turnaround time. The two-tailed paired t-test enabled analysis of the differences in the observations of the paired samples. The 0.05 level of significance was selected. Data was analyzed using the Statistical Packages for the Social Sciences (SPSS-X). The researcher used descriptive statistical analysis to evaluate the research questions concerning the Article Clearinghouse's holdings, fill rate, quality of materials received, and costs.

## Procedures

The research for evaluating document delivery service to the interlibrary loan department at UW-SP began on October 21 and ended on December 11, 1987, for a total of 37 consecutive work days. The planned timing of this study allowed for a typical representation of requests during an

academic semester or calendar year. Analysis of past annual reports for the department indicated that October is consistently one of the heaviest months of the year for interlibrary loan requests, whereas December typifies the lighter usage that comes at the ends of semesters and during interims. The study period also accurately represented the range of requests by patron type and subject.

In order to fund this study, the researcher requested and received from the UW-SP Personnel Development Committee a grant of $975, which was used to establish a deposit account with the Article Clearinghouse. Extra funding was not necessary for the requests sent to WILS since those charges are customarily part of the interlibrary loan department budget.

During the 37 day period, the researcher considered all periodical article requests submitted by faculty, staff, graduates, undergraduates, and community users as candidates for the study and processed them in the order received. For a request to be included in the research study, it had to be available both from the Article Clearinghouse and from WILS. The researcher determined availability by searching the Article Clearinghouse catalog, state, regional, and national union lists, and online records for availability and recorded the Article Clearinghouse order numbers and UW-Madison call numbers on the request forms. Requests for periodical articles that were available from only one of the

suppliers were entered on a tally sheet. The tally noted the subject field of the request and the supplier that was unable to deliver the material. These requests were then sent to other conventional sources, as is usual interlibrary loan practice.

Excluded from the study were photoduplication requests for transactions, proceedings, tables of contents, sections within books, Educational Resources Information Center (ERIC) materials, technical reports, and government documents, all of which are materials unlikely to be available from a collection-based commercial document delivery service. The researcher also eliminated from the study requests with incomplete, inaccurate, or otherwise problem citations which might cause internal processing delays.

Eventually, 124 requests met all the criteria to be included in the study. After the researcher verified a bibliographic citation, the Library Assistant transmitted the requests electronically via the OCLC ILL Subsystem. Identical requests went to the Article Clearinghouse and WILS within minutes of one another on a continuous alternating basis throughout the research period. WILS received the first transmission of the study, as determined by the flip of a coin.

The researcher entered each of the 124 requests in a special log. These requests were also noted in the daily log

and statistic sheet that the department routinely maintains. The Library Assistant placed colored asterisks (pink for Article Clearinghouse and blue for WILS) on the computer-generated print-outs filed for all interlibrary loan requests. These asterisks alerted the office staff that messages concerning those requests or receipt of the reqested photocopies should be brought to the immediate attention of the researcher, who then examined messages received and/or photocopies received and recorded appropriate data in the project log.

Patrons always received the first photocopy to arrive. The procedure design maximized the research as a decision-making tool while minimizing inconvenience and interruption in the regular departmental workflow of service to patrons.

## Instruments, Materials, and Equipment

### The Log

Information needed for the statistical analysis and qualitative evaluation of document delivery service by the Article Clearinghouse and WILS was recorded in an 11 inch by 17 inch log book similar to the one the researcher organized and has used for the last 9 years in the interlibrary loan department. The log sheet has 17 column divisions, an unlabeled column followed by 16 numbered columns. For the purposes of this study, the unlabeled column was used to

record the date that identical requests were sent to the Article Clearinghouse and WILS. Information concerning the WILS request was recorded in columns 1 through 8 and similar information concerning the Article Clearinghouse request was recorded in columns 9 through 16.

The 8 columns assigned to each document delivery service were organized in the following fashion: column 1 contained the request number; column 2 was used to record date and reason if a request could not be filled; column 3 was used to record the date materials were actually received; column 4 was used to indicate if the material had been sent via telefacsimile; column 5 noted if the correct material had been sent; column 6 noted if all pages were present; column 7 indicated if the photocopy contained the entire original page; and column 8 noted legibility.

The log sheet would normally allow for 35 entries per page, but an extra line was allotted for each matched pair of requests. This line allowed space to record additional information: notations concerning readability of text and clarity of photographs and graphic material; messages from suppliers such as "best copy available"; additional actions to complete a request, such as a reissue of a request to provide a missing page; and calculated data such as number of business days from transmission of request to receipt of materials.

Verification Tools and Transmission Method

The researcher identified holdings at the Article Clearinghouse and WILS for each serial request by searching those tools used routinely for location verification. These verification tools included: The Union Catalog of Serials Currently Received in the Libraries of the University of Wisconsin-Madison (UCAT); The Minnesota Union List of Serials (MULS); Union List of Serials/New Serials Titles (ULS/NST); UMI Article Clearinghouse Catalog; OCLC Union List of Serials; and other standard sources.

The Library Assistant used the OCLC ILL Subsystem to send all requests in this study to both the Article Clearinghouse and WILS. This electronic means of transmission ensured that each supplier received an identical request at approximately the same time. The OCLC ILL Subsystem serves as the usual means for transmitting requests by the UW-SP Interlibrary Loan Department.

Payment Accounts

After two telephone calls and the filing of a deposit account registration form, the researcher was able to establish a deposit account with the Article Clearinghouse. The company also accepts prepayment or credit card charges, but the deposit account offers the most attractive terms to an individual library, according to the company's price schedule. The company uses a three-tiered pricing structure.

They charge new accounts $7.50 per article for the first 499 requests. Charges are reduced to $6.50 per article for the next 500 requests. Beyond 1000 requests per year, the price drops to $5.50 per article. To allow for a sample size of approximately 130 at $7.50 per request, the researcher placed $975 in the deposit account, the funds coming from a UW-SP Personnel Development Committee grant.

As a participating library in the WILS network, the UW-SP University Library paid $4.45 for each of the 124 requests sent to WILS. These were the customary charges that would have accrued whether or not the research project was in progress.

There was one other way of accessing the Article Clearinghouse that the researcher did not plan to use. In 1985, the Article Clearinghouse entered into a multiple institution contract with WILS which allowed member libraries of WILS to send requests to the Article Clearinghouse but have them invoiced through WILS at $4.00 per article published after 1978 and $8.00 per article published before 1978. This low rate is applicable only until the deposit account is exhausted. In addition, the researcher believed identical requests ultimately billed to WILS might lead to questions by both the Article Clearinghouse and WILS that could jeopardize the validity of

the results. Also, the UW-SP deposit account appeared to be the most direct method of payment for this short-term study.

## Limitations

The research results provided the researcher with valid information to aid in the decision process of selecting a document supplier. Certain concepts, however, may not be applicable to all interlibrary loan services due to local library practice and structure.

For the purposes of this research, the definition of document delivery is the supplying and delivering of duplicated periodical articles. Also for the purposes of this research, turnaround time is the period from the date the request was sent to the date the materials arrived.

Waldhart (1985) listed the components of total turnaround time as borrowing library processing time, request transit time, lending library processing time, material transit time, and, again, borrowing library processing time. Since the purpose of this research was to evaluate the service of the commercial document supplier, the internal preparation of the request, involving bibliographic and location verification, and the internal processing of the received material before delivery to the patron were not measured or included for consideration in this study. Also not considered was request transit time,

which is virtually instantaneous when using the OCLC ILL Subsystem.

The researcher treated the remaining two turnaround time components, supplier processing time and material transit time, as a single unit. No attempt was made to separate the two components in the present study, but that might be a useful consideration in future studies. By examining the OCLC message file for "Date Shipped" status or postmarks on packages, one could determine when the materials entered the transit phase.

Methods for computing the costs of interlibrary loan service vary widely and become difficult to compare in a meaningful fashion. Policies and procedures differ, as do the personnel involved. Therefore, the cost variable in this study was limited to the direct charges involved.

A further limitation of this study was the decision to examine only one collection-based document delivery service, the Article Clearinghouse. Other similar firms include the Genuine Article Service of the Institute for Scientific Information, Inc. and the Chemical Abstracts Service (CAS). Also excluded were information brokers who rely on the resources of established public, academic, and special libraries. Information On Demand is an example of such a broker, and the company accepts requests for a wide range of information needs, not just photocopies of journal articles. All of these firms, and others, too, may be deserving of re-

search to determine their usefulness to interlibrary loan, but that was not within the scope, time constraints, or financial constraints of the present study.

# CHAPTER 4

## RESULTS

In recent years, interlibrary loan activity has been on the increase, at least in part due to easy and rapid access to electronic bibliographic citations. Thus, for the interlibrary loan librarian, the selection of a source to efficiently supply desired materials is an important management decision. In the past, libraries borrowed almost exclusively from other libraries, either directly or via consortium arrangements, but within the past decade an alternative to the traditional interlibrary loan library-to-library borrowing has developed with the establishment and growth of commercial document delivery firms. However, a recent survey of the literature revealed that the role of document delivery firms in the academic library environment is not clear and that studies are needed to evaluate their services.

To determine if a commercial firm can serve as an effective and efficient source for filling photocopied article requests, the researcher conducted a study at the University of Wisconsin-Stevens Point (UW-SP). Identical pairs of requests were sent to the University Microfilms Article Clearinghouse and Wisconsin Interlibrary Services (WILS). The null hypothesis of the evaluation design stated that there is no difference between document delivery service offered

by a commercial document delivery source, the Article Clearinghouse, as compared to a traditional library source, WILS. The alternative hypothesis stated that there is a difference between the two services.

The researcher verified ownership of the periodical title, volume, and year for each of the two sources by checking the Article Clearinghouse catalog and regional and national union lists and then sent identical, almost simultaneous requests to each service. Data was collected concerning request fulfillment, turnaround time, copy quality, and costs. The results from the collected data allowed comparisons of the services and materials received. The researcher considered the following questions for evaluating a commercial document delivery firm:

1. Did the Article Clearinghouse's collection of journals meet the UW-SP University Library's needs?
2. Was the Article Clearinghouse's fill rate equal to or better than the WILS rate?
3. Did the Article Clearinghouse's turnaround time compare favorably with that of WILS?
4. Were all the Article Clearinghouse photocopies of acceptable to excellent quality?
5. Were the Article Clearinghouse's charges competitive with WILS' charges?

## Journal Availability

Evaluation of how well the commercial firm met UW-SP research needs during the 37 day study was determined by recording subject deficiencies in the collection. Ninety-two requests (nearly 40% of the total) were ineligible for the study because periodical titles were not owned by the Article Clearinghouse. Unavailable articles were most often in the subject areas of medical science, psychology, education, chemistry, biology, and literature.

Twelve requests were excluded from the study because the University of Wisconsin-Madison campus libraries did not own the periodicals. Nine of those titles were in the field of education.

## Fill Rate

Of the 124 matched pairs of requests sent in the study, 118 were completed and received from both the commercial firm and the traditional library source. WILS was able to fill all 124 requests either directly or by referral to a member library.

The Article Clearinghouse was unable to fill six of the requests. Reasons given were: "volume not available," "year not available," "not yet available," and twice, "no permission to reprint." In one situation the Article Clearinghouse was "unable to locate article"; however, a WILS referral library did fill the request. The author and

pages were accurate as cited on the order. Only the title was different.

## Turnaround Time

The researcher measured the speed of delivery or turnaround time from the date the request was sent to the date the material was received. The elapsed time was calculated in both calendar days and business days for each of the 118 completed paired observations. Compiled data was analyzed using the two-tailed paired *t*-test. The mean number of business days for the Article Clearinghouse was 5.59 and 5.33 for WILS. The computed results shown in Table 1 revealed that both the mean calendar days and mean business days in turnaround time from the Article Clearinghouse and WILS did not differ significantly: the *t*, for calendar days (117), was 1.07, $p = .289$; the *t*, for business days (117), was 0.94, $p = .352$. Thus, the null hypothesis which stated that there is no difference between document delivery service offered by a commercial document delivery source, the Article Clearinghouse, as compared to a traditional library source, WILS, is retained.

Table 1

Turnaround Time Results

| Measurement | Article Clearinghouse | Wisconsin Interlibrary Services |
|---|---|---|
| Mean Calendar days | 7.76 | 7.31 |
| Standard deviation | 2.82 | 4.30 |
| Mean business days | 5.59 | 5.33 |
| Standard deviation | 1.82 | 2.59 |

Factors influencing turnaround time included referral to member libraries by WILS and telefacsimile delivery by both WILS and the Article Clearinghouse. WILS referred eight of the requests to member libraries. One request had to be referred twice, leading to the longest turnaround time of the study, 17 days. The other seven referrals took an average of 9 days to arrive.

In accordance with the typical UW-SP Interlibrary Loan ordering pattern, the Library Assistant transmitted some of the 124 samples in the morning and some in the afternoon. The researcher designated telefacsimile document delivery service for 12 pairs, leading to the minimum number of business days in turnaround time: same day delivery for two re-

quests by the Article Clearinghouse and second day delivery for four requests by WILS.

All 12 articles arrived by facsimile as requested from the Article Clearinghouse, which charged $9 per article for their special Artifax service. According to the company's policy concerning Artifax service, they deliver any request sent before 1:30 P.M. EST that same day and they deliver all other requests the next morning. Of the seven orders placed by 1:30 P.M. EST, two arrived the same day, three the next day, and two on the third day. The mean turnaround time for all seven was 2 business days. The remaining five requests were transmitted in the afternoon and each arrived on the second day.

Of the 12 articles requested for facsimile service, WILS sent only 4 by that method. They each arrived on the second day. Four of the study's regular requests to WILS were received on the fax machine.

## Copy Quality

Both the Article Clearinghouse and WILS provided the correct article for each of the 118 requests they filled. However, each service had four instances in which incomplete articles were sent, requiring follow-up phone requests. One document from the Article Clearinghouse lacked six pages. The researcher contacted the company using their toll-free line and was told to expect Federal Express delivery of the

missing pages. The complete item arrived 4 business days later via first class mail. The remaining three incomplete articles had been delivered by telefacsimile, as per request, but for two of the three the replacement pages were not delivered by that method, causing an additional delay of 4 to 6 days.

It took WILS 5 business days to supply missing pages for one article and 11 business days to supply them for two other articles. WILS never did supply missing pages for a fourth article.

Both the Article Clearinghouse and WILS had three occurrences of pages with incomplete text. One article from the Article Clearinghouse had part of a biology figure and the accompanying text cut off. The last line on several pages was cut off on another article. The third article had text missing from the right side on three pages. All three articles received from WILS had partial text missing from the inside margin area.

The researcher evaluated received articles for legibility and noted negative observations in the study's log. The most frequently occurring comments related to the Article Clearinghouse materials included "not clear image" and "not sharp focus." Light photographs and figures, faint letters, and dark lines across a page were additional concerns. Two articles contained dark smears with the attached message "Best copy attainable." Legibility

problems appeared in 17 Article Clearinghouse documents. The notes "Difficult to reproduce" and "Best copy from filmed material" were sent with 2 articles, but those copies were sharp, clean, and legible. In 5 other cases, the print size was reduced from that of the original text.

Legibility concerns numbered 31 for WILS photocopied articles. Darkened or blurred print facing inside margins was the most common criticism. One article had print which could be rubbed off. Dark vertical stripes marred the pages of several articles. Occasional words or lines on article pages were blurred and difficult to read. Light photographs and text were evident in a few cases.

Direct comparison of documents was possible whenever a pair of articles from the two sources arrived on the same day. The researcher noted that the Article Clearinghouse copied each page of an article on a separate exposure, whereas WILS often sent two pages on one photocopy. Other observations of paired material turned up "clearer photographs," "sharper focus," and "better copy" for one or the other source. In 14 instances, the Article Clearinghouse photocopies were superior to the WILS phtocopies. In 6 instances the WILS copies were superior to the Article Clearinghouse copies. Several other pairs were very similar in overall good quality.

## Costs

The cost comparison is based on the direct invoiced charge for the 118 requests of the completed matched pairs. For WILS that calculation was quite straightforward; they charged $4.45 for each of the 118 requests for a total of $525.10.

Determining the Article Clearinghouse costs was more complex. Although the researcher established a deposit account of $975 with the Article Clearinghouse and noted the account number on each request sent to the firm, the Article Clearinghouse did not bill the UW-SP account. The researcher investigated the lack of itemized statements with staff of the Article Clearinghouse and found that the firm had processed all charges under the multiple institution account, with the invoices sent to WILS. The researcher subsequently secured the necessary statements from WILS to continue the evaluation study.

As a customer incentive, the Article Clearinghouse offered to deliver the first five articles free of charge within a designated week. Only articles published within the past 5 years qualified. The Article Clearinghouse was unable to fill the first requested free article due to the company's lack of permission to reprint. The firm granted a no-charge status to three of five other designated requests, selected one other title, for a total of four free items,

and then credited the four items to the multiple institution account invoiced through WILS.

The Article Clearinghouse sent a duplicate of one article and charged an additional $8. The company sent another article by facsimile but did not bill for the Artifax service. However, they did impose a "Rush 1st Class" charge of $5 for supplying missing pages for that same item. One month's statement included a $3.60 shipping and handling charge.

The items billed through the multiple institution account with WILS would ultimately have been received by UW-SP at the contract rate of $4 per article published after 1978, $8 per article published before 1978, and $9 extra for each facsimile service request. The Article Clearinghouse costs for the 118 requests billed in this fashion totaled $631.60. The average cost for an article from the commercial firm was $5.35, ninety cents more per article than the traditional library source. If the UW-SP deposit account had been billed as planned in the original design of the study, the average cost per article for commercial document delivery would have been $8.42, or $3.97 more per article than WILS.

## Summary

The researcher conducted a study at UW-SP to determine if a commercial document delivery firm could serve as a

viable alternative to the traditional library-to-library borrowing for supplying articles. Analysis of the total number of requests received during a 37 day period revealed that 40% of UW-SP interlibrary loan requests could not be supplied by the University Microfilms International collection. Of the 124 pairs of matched requests sent to both the Article Clearinghouse and WILS, the commercial firm filled only 118 orders, although all requested periodical titles and years were listed in the company's catalog.

The traditional library source, WILS, had a 100% fill rate. All requested titles were listed as owned by the University of Wisconsin-Madison libraries; however, eight were referred to other Wisconsin libraries, leading to a longer delivery time.

The difference in turnaround time for delivery of documents by the Article Clearinghouse and WILS was not statistically significant. Speed of delivery was not gained by accessing the commercial firm.

Most Article Clearinghouse photocopies were of acceptable to excellent quality. Problems with missing pages and legibility were similar in scope and quantity to the conventional library source.

Cost and ease of payment are also important factors in evaluating the service of a commercial document delivery firm. Specifications concerning the deposit account were not followed by the commercial firm, and some charges seemed

inconsistent. WILS charged $4.45 per article. The Article Clearinghouse billed the multiple-institution account through WILS an average of $5.35 per article. If they had billed the UW-SP deposit account as requested, the cost would have been $8.42 per article.

The results of the study show that a commercial firm, the Article Clearinghouse, can serve an interlibrary loan department in an academic setting. However, in comparison to the traditional library source, the document delivery firm's collection was found to be limited in supplying many research needs, the fill rate was lower, the turnaround time was not significantly faster, and the cost per article was greater. A summation of the results is shown in Table 2.

Table 2

A Summary of Document Delivery Performance

| Evaluation Factors | Article Clearinghouse | Wisconsin Interlibrary Services |
|---|---|---|
| Articles not available | 92 | 12 |
| Sent 124/No. filled | 118 | 124 |
| Turnaround time | | |
| Calendar days | | |
| Mean | 7.76 | 7.31 |
| Minimum | 1 | 2 |
| Maximum | 16 | 27 |
| Business days | | |
| Mean | 5.59 | 5.33 |
| Minimum | 1 | 2 |
| Maximum | 12 | 17 |
| Average cost | $5.35[a] | $4.45 |

[a]Cost to the multiple institution account. Had the deposit account been charged, the average cost would have been $8.42.

# CHAPTER 5

# DISCUSSION

## Conclusions

The purpose of this research was to determine if a commercial firm can serve as a viable alternative to the conventional library source for academic interlibrary loan document delivery of articles. The answers to the study's five evaluation questions reveal that the Article Clearinghouse, a commercial document delivery firm, can provide photocopied articles of good quality, but at greater cost and without improvement in the turnaround time. In addition, many requests could not be directed to the company because of limited collection coverage, and for the requests that were sent, the commercial firm's fill rate was less than that of the traditional source, Wisconsin Interlibrary Services (WILS).

### Journal Availability

Requests made by the University of Wisconsin-Stevens Point (UW-SP) population typically represent a wide range of needs with no particular emphasis in specialized subjects. According to the Article Clearinghouse, copyright-cleared access to their broad range of over 10,000 periodicals extending from popular to highly technical is considerable and growing. However, the company's collection did not hold

periodical titles needed to fill 40% of the requests received during the study period. In comparison, union lists for the University of Wisconsin-Madison campus libraries indicated ownership for 95% of the study's requests, not an unexpected result given the fact that over 45,000 journal titles are available at the Madison campus.

Fill Rate

Of the 124 requests sent, the fill rate for the Article Clearinghouse was 95% compared to 100% for WILS. The Article Clearinghouse did not fill six requests, two because of copyright clearance difficulties. Three received "not available" replies, although all ordered periodical titles and years were listed as owned in the company's catalog. The sixth request was unfilled because of an inaccurate article title, even though the rest of the citation was correct and the traditional source was able to fill the request given exactly the same information.

Turnaround Time

The Article Clearinghouse's mean turnaround time of 7.76 days for document delivery did not differ significantly from the 7.31 days for WILS, meaning that for this study there was no distinct time advantage in ordering from the commercial firm. Furthermore, the mean turnaround time of 2 days for the commercial firm's telefacsimile service, which

required an additional $9 charge per article, was inconsistent with their catalog description of same day or overnight delivery of articles.

Copy Quality

Not all pages received from the Article Clearinghouse were of excellent quality, but overall, most photocopied articles were acceptable. Missing pages and legibility concerns occurred and were similar to problems experienced with the traditional library source. The research results show that the commercial firm usually provided a clean, legible copy; however, that high quality was somewhat inconsistent.

Costs

Document delivery as provided by the Article Clearinghouse was more costly than that provided by WILS, and the company was unreliable in its billing services. Although the researcher had established a deposit account and noted that deposit account number on each request submitted, the company did not bill any of the 118 requests sent during the 37 day period to the correct account. Instead, the Article Clearinghouse billed a multiple-institution account established a number of years ago by WILS. When contacted by telephone, an Article Clearinghouse staff member offered no explanation for the error. The researcher eventually obtained the billing statements from the

multiple-institution account at the University of Wisconsin-Madison and was able to proceed with the evaluation.

The direct charges for the study's 118 completed pairs cost $106.50 more from the commercial document delivery service than from the traditional library service or ninety cents more per article. However, had the deposit account been billed rather than the multiple-institution account, the 118 articles would have cost $468.46 more or $3.97 more per article. This latter figure is probably a more realistic cost comparison for the two services since the multiple-institution agreement between the Article Clearinghouse and WILS is about to run out, and it is unlikely to be renewed at the previous rate schedule. In addition, many academic libraries looking to use a commercial document delivery firm would establish their own deposit accounts.

Copyright Considerations

One clear advantage that commercial document delivery services have over traditional sources is copyright clearance. Copyright-cleared access to titles in the Article Clearinghouse catalog represent contracts with publishers, and this service can alleviate concerns about compliance with federal copyright restrictions and reduce otherwise mandated record-keeping. Some publications listed in the

catalog are subject to a $1.50 copyright fee in addition to the regular prices, but no articles in the study were subjected to this additional fee. However, the message, "no permission to reprint" was received for two unfilled requests.

To summarize, the results of this study show that the Article Clearinghouse, when compared to WILS, performed less well in collection coverage and fill rate, provided copies of similar quality, equalled but did not better the turnaround time of the traditional source, and charged significantly more per article. Thus, the services of the commercial document delivery firm provided no clear advantage. However, copyright compliance may at times deem it appropriate and convenient for the interlibrary loan manager to select the commercial firm as a supplier.

## Implications and Recommendations

The managerial functions of planning, organizing, staffing, leading, and controlling (Koontz, O'Donnell, & Weihrich, 1986) all interact in a successful interlibrary loan operation. Of special importance in selecting a commercial document delivery service firm are the planning, organizing, and controlling functions, all of which were used extensively in the present study. Out of this study arise a number of implications and recommendations for making effective management decisions.

Three studies (Currie, 1987; Hurd & Molyneux, 1986; Williamson, 1987) previously evaluated commercial document delivery services and compared them to traditional library sources. The results of the UW-SP study reinforce many of the findings of the earlier studies.

A primary consideration of document delivery is whether the article is available and deliverable. The results of this study were consistent with the earlier studies which showed that commercial companies owned limited resources and that some requests were unfilled even though the ordered titles were listed as available. The researcher confirmed Currie's findings that traditional library sources supplied a greater percentage of requested documents.

Another consideration is copy quality. Hurd and Molyneux found that the Article Clearinghouse's photocopy quality was noticeably better in some cases. The same was true in this study. However, the two studies revealed inconsistent service and quality. Both commercial firms and traditional sources need to give additional attention to service and quality reliability of document delivery.

The researcher's findings on turnaround time differed from the results of the previous studies. Currie concluded that speed of delivery can be gained from commercial sources but at great monetary cost; Hurd and Molyneux reported that the commercial firm was 2.5 business days faster than the conventional source but there was greater inconsistency in

delivery time; Williamson found an average of 9 days for commercial turnaround time compared to 11.5 days for libraries. The present study showed improved turnaround times for both the commercial firm and the traditional source, but with enough improvement in the traditional source to equal the turnaround time of the commercial firm. In view of this finding, the advantage of selecting a commercial firm, the more expensive source, for document delivery is diminished.

What role, then, can a commercial firm play in an academic library environment? Commercial document delivery firms specializing in a major subject area have potential to further enhance effective fulfillment of article requests. One such firm, the Chemical Abstracts Service (CAS), provides access to scientific and technical titles, some of which are not readily available through traditional channels. However, to determine the potential of these more specialized commercial firms to save the academic interlibrary loan manager time and money requires additional research.

The study's data indicate that telefacsimile document delivery has great potential to decrease the turnaround time of photcopied articles. With the onrush of electronic bibliographic citations, library users expect and demand speedier receipt of materials. If interlibrary loan service can provide consistent delivery within a day or two, combined with good copy quality, much will be accomplished

toward patron satisfaction and fulfillment of research needs in a timely fashion. Further study of facsimile costs and development of telefacsimile networks is needed.

Finally, the study brings renewed credibility to the document delivery performance of the state resource sharing system in Wisconsin. In planning for effective document delivery service interlibrary loan managers with access to WILS can utilize the non-profit library source with confidence.

This does not mean, however, that the services of commercial document delivery firms can or should be ignored, even though an academic interlibrary loan service has access to an excellent traditional source. Despite greater cost per article and turnaround time only equivalent to a traditional source, a wise selection policy will include commercial firms as alternatives for handling copyright clearance problems and for obtaining otherwise difficult to secure materials. By expanding the options available for obtaining photocopied articles, the interlibrary loan manager cannot help but improve service to library users.

Because of rapidly changing technology, improving levels of service by both commercial and traditional suppliers of photocopied documents, and the establishment of new commercial firms, interlibrary loan service is in a state of flux that demands further and continuing research. Only by staying abreast of the changes and carefully selecting

sources of supply and modes of delivery can the interlibrary loan manager successfully provide high quality service at the least expenditure of often scarce library dollars.

# REFERENCES

Allen, G.G. (1985). Interlibrary loans, present and future: A consideration of consequences for academic library management. IFLA Journal, 11, 11-23.

Bennett, R.J. (1984). Interlending and document supply: A review of recent literature: VI. Interlending and Document Supply, 12, 95-100.

Bennett, R.J. (1985a). Interlending and document supply: A review of recent literature: VII. Interlending and Document Supply, 13, 13-18.

Bennett, R. J. (1985b). A world picture of interlending 1975-85: A review of reviews. Interlending and Document Supply, 13, 105-109.

Boucher, V. (1984). Interlibrary loan practices handbook. Chicago: American Library Association.

Budd, J. (1986, Fall). Interlibrary loan service: A study of turn-around time. RQ, 26, 75-80.

Campbell, C. (1985, February 25). Torrent of print strains the fabric of libraries. The New York Times, p. A10.

Colbert, A.W. (1983, July). Document delivery--Payment methods for documents can make a difference in delivery times. Online, 7, 78-79.

Currie, J. (1987). Document delivery: A study of different sources. International Association of Agricultural Librarians and Documentalists. Quarterly Bulletin, 32, 13-17.

De Gennaro, R. (1979, June 1). From monopoly to competition: The changing library network scene. Library Journal, 104, 1215-1217.

De Gennaro, R. (1981, April). Computer network systems: The impact of technology on co-operative interlending in the USA. Interlending Review, 9, 39-43.

Dougherty, R.M. (1978, March). Campus document delivery systems to serve academic libraries. Journal of Library Automation, 11, 24-31.

Finnigan, G., & Rugge, S. (1978, January). Document delivery and the experiences of information unlimited. Online, 2, 62-69.

Henshaw, R. (1984, November). Library to library. Wilson Library Bulletin, 59, 204.

Henshaw, R. (1985, September). Library to library. Wilson Library Bulletin, 60, 54-55.

Hurd, D.P. (Speaker). (1986). An evaluation of delivery times and costs of a non-library document delivery service. Presented at the Fourth National Conference of the Association of College and Research Libraries. (Cassette Recording). Chicago, ACRL.

Hurd, D.P., & Molyneux, R.E. (1986). An evaluation of delivery times and costs of a non-library document delivery service. In Association of College and Research Libraries, Energies for transition: Proceedings of the Fourth National Conference (pp. 182-185). Chicago, ACRL.

Information Systems Consultants Inc. (1983). Document delivery in the United States: A report to the Council on Library Resources. Washington, D.C.: Author.

Kennedy, S. (1987, July). The role of commercial document delivery services in interlibrary loan. Interlending and Document Supply, 15, 67-73.

Kenney, B.L. (1982, Fall). Library information delivery systems: Past, present, and future. Drexel Library Quarterly, 17, 36-64.

King Research, Inc. (1982). Libraries, publishers and photocopying: Final report of surveys conducted for the United States Copyright Office (Library of Congress Contract Number LC 2328). Rockville, Maryland: Author.

Koontz, H., O'Donnell, C., & Weihrich, H. (1986). Essentials of management (4th ed.). New York: McGraw-Hill.

Library of Congress Network Development Office. (1982). Document delivery--background papers commissioned by the Network Advisory Committee (Network Planning Paper No. 7). Washington, DC: Library of Congress.

Line, M.B. (1979, April). National interlending systems: Existing systems and possible models. Interlending Review, 7, 42-46.

Line, M.B. (1983, April). Document delivery, now and in the future. Aslib Proceedings, 35, 167-176.

Pickup, J.A. (1978, January). Commercially funded services--an appraisal from the viewpoint of the smaller user. Aslib Proceedings, 30, 25-33.

Pings, V.M. (1974, July). Improved document delivery services. Library Trends, 23, 89-107.

Waldhart, T.J. (1985a, July-September). Patterns of interlibrary loan in the U.S.: A review of research. Library and Information Science Research, 7, 209-229.

Waldhart, T.J. (1985b, October-December). Performance evaluation of interlibrary loan in the United States: A review of research. Library and Information Science Research, 7, 313-331.

Wiggins, G.D. (1985). Factors which influence the choice of document delivery mechanisms for serials by selected scientific and technical special librarians (Doctoral dissertation, Indiana University, 1985). Dissertation Abstracts International, 46, 1429-A.

Williamson, M. (1987). Commercial document delivery services and interlibrary loan: A comparison. Unpublished manuscript, Wisconsin Interlibrary Services, Madison.

Wood, J. L. (1982). Private-sector, non-library document delivery services. In Association of Research Libraries, Prospects for improving document delivery: minutes of the 101st meeting. (ERIC No. ED 234 785)